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ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/626,209	DEVOE, IRVING W.	
	Examiner	Art Unit	
	Krishnan S. Menon	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42,47-52 and 57-71* is/are pending in the application.

4a) Of the above claim(s) *1-41 and 60-65* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *42,47-52 and 57-59 and 66-71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-42, 47-52, and 57-71 are pending as amended 11/30/06, after filing an RCE, of which claims 1-41 and 60-65 were withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 42, 47-52 and 57-59 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Applicant's claims recite a process for producing energy derived from the chemical potential of concentrated solute-solutions using a semi-permeable membrane. Applicant's specification, at page 26, lines 7-22, (paragraph 0090 of the Pre-Grant Publication) and figure 10 A and B, shows the balance between input energy and output energy. As an example, take column 2 of figure 10 A and B, which show AlCl3.6H2O as solute and water as solvent. This shows output energy as 1634 KWh/day more than what was supplied, and the calculation includes all energy inputs required for running the system including any external energy supplied. It shows that 1634 KWh per day of

energy is derived from nowhere, which is against the known principles of physics. Therefore the process is not enabling.

The description for figure 5 at page 18 of the specification states, "one skilled in the art would recognize that any suitable means, such as heating, may be used to vaporize the solvent". However, this description is only provided as a general statement; applicant's process appears to be generating energy from nowhere. Lines 15-25 in page 18 describes vacuum as the source of energy, and that lowering the vaporization temperature would conserve energy.

Regarding generating and maintaining vacuum; applicant's specification discloses (quoted from the PGPUB of the applications):

[0061] In the illustrated configuration, the blowdown receiving chamber 56, the condenser 57 and the solvent chamber 20 are hermitically joined and the internal space throughout is under vacuum at or near the vapor pressure of the solvent. The maintenance of the temperature inside the solvent chamber 20 and the condenser at or below the vapor pressure point of the solvent at a given low pressure (i.e., vacuum) promotes vaporization of the solvent, as well as transformation of the vapor into a liquid in the condenser 57 and preservation of a liquid state in the solvent chamber 20. For example, lowering the pressure over the solvent in the solute solution exhausted from the exhaust channel and into the blowdown receiving chamber 56 lowers the boiling point of the solvent, allowing vaporization to occur at a lower temperature, which thereby conserves energy.

[0062] As an example, the vaporization point of water at 760 mm (1 atmosphere) of mercury (Hg) is 100.degree. C., whereas water vaporizes at 51.degree. C. at 100 mm Hg. Another example is the solvent methanol, a solvent in which FeCl.sub.3, LiCl, and AlCl.sub.3 are highly soluble, vaporizes at 64.5.degree. C. at 760 mm Hg; however, at 100 mm Hg methanol vaporizes at a temperature of 21.degree. C. Isopropanol is an example of a solute that has a lower boiling point than the solvent H.sub.2O.

The power required to vaporize such solvents or solutes can come from a portion of the energy generated by an alternator(s) or generator(s) powered by the energy generating system 10.

[0063] The vacuum may be induced or maintained in the solvent chamber 20, blowdown receiving chamber 56 and the condenser 57 by diffusion of solvent molecules from the solvent chamber 20 into the pressure chamber 30 leaving a void, as described above. According to a preferred embodiment, the low pressure (vacuum) over the solvent in the solvent chamber 20 is maintained constant within a small range by selectively opening and closing the solvent chamber for appropriate time intervals. One skilled in the art will recognize that an external or bolt-on vacuum pump may also be used to achieve and/or maintain a vacuum.

[Emphasis added]

And in paragraph 67, it is disclosed that the vacuum pump may be operated by power generated by the system itself.

Since the claimed invention uses vacuum as the power source, and the above paragraphs indicate that the energy is derived from the system itself for generating the vacuum and no other energy is supplied for evaporating the solvent, the process as disclosed and claimed is unsustainable, and therefore, non-enabling.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 57-59 are rejected under 35 U.S.C. 102(b) as being anticipated by Loeb (US 3,906,250).

Loeb'250 teaches (see figure 3 and 4) a method of producing vacuum comprising a semipermeable barrier separating a pressure chamber and a solvent chamber, wherein the pressure chamber has a solution (sea water) and solvent chamber has a solvent (river water), the solvent flows from the solvent chamber to the pressure chamber across the membrane, and the solvent chamber has a vacuum (because pressure is zero atm in figure 3 and 4 in river water chamber). The claims recite the solvent chamber as closed and pressure chamber as open. The solvent chamber in the reference could be closed to flow of river water and the pressure chamber could be open to flow of sea water as desired, and the apparatus would be inherently capable of doing so. Note that the reference teaches that the process would eventually stop without flow, which supports the inherent teaching of closed solvent chamber (see column 4 lines 25-53, and especially 47-50). Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986). See also figure 11, which is a closed system with the solvent chamber having only inflow, wherein the solvent chamber is at zero pressure.

The solute-solution is exhausted from the pressure chamber as in claim 58 – see flowing through the turbine.

With regard to the step of controlling the flow of solvent from the solvent chamber as in claim 59, the reference teaches that he transient process would ultimately stop with out flow through the chambers, and a continuous process could be carried out by the outlined control of the process – see column 4 line 55 – column 5 line 10, and figures 3a and 4a. Please note that the river water pressure is still maintained essentially at zero. See also figure 11, wherein the solvent chamber is at zero pressure, and the process is maintained continuous by a controlled inlet flow equal to the flow through the membrane.

Claim 57 is also not patentable because it is only an elaboration of the principle of osmosis, wherein when a solvent is separated from a solution by a membrane, the pressure in the solvent chamber will reduce and the pressure in the solution chamber will increase as the solvent migrates into the solution through the membrane because of osmosis. The solvent chamber thus would have a vacuum, or reduced pressure. Figure 1, 2a and 2b of Loeb explains this principle.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 42, 50-52 and 66-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over by DE 3121968.

DE teaches a method of pressurizing a solute solution and converting the pressure to energy (by a turbine or by a reciprocating machine, which is a piston machine: see claims 22, page 8, and 28, page 9 of the English translation of the reference; piston in the reciprocating machine has linear displacement) using a solvent by passing the solvent across into the solution through a semipermeable membrane – see figures. The solution is exhausted after the pressure is converted to energy as claimed. The solvent chamber is pressurized by a pump – see figure 1, pump 22.

The claims differ from the teaching of the reference in the use of vacuum for evaporating the recycling solvent. However, DE teaches solvent recycle; and that the process of evaporation can be optimally selected from the various available methods – see pages 16-20 of the English translation – including air circulation, heat pump, and solar energy. Using vacuum for evaporation, particularly at ambient temperature, is known in the art. One would use vacuum to increase the rate of evaporation and prevent air leak into the system by maintaining a vacuum. See, for example, Loeb'250, column 11 lines 59-65.

DE teaches adding external energy to perform the recycling process as claimed – see pages 16-20 of the English translation and claims 6 and 7.

3. Claims 42 and 47-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeb (US 3,906,250) in view of DE 31 21 968.

Claims 42 and 50: Loeb'250 teaches a method of producing high pressure and energy by providing (see figure 6) a solvent chamber (river water), a solute-solution chamber (concentrated brine), semipermeable membrane separating the solvent and solution chambers (in 60), so that solvent diffuses through the membrane to pressurize the solution, converting the increased pressure to energy (by turbine 67). See also column 8 line 59 – column 9 line 47. Also see figure 10, 11, etc.

Claims differ from the teaching of Loeb'250 in the recitation of the hydraulically driven piston for energy conversion, or displacement. Loeb teaches a turbine for energy conversion. DE teaches that a reciprocating machine or a turbine could be used as alternates for the process. It would be obvious to one of ordinary skill in the art at the time of invention to use a reciprocating machine, which works with linear displacement of pistons, as alternate but equivalent to the turbine for energy conversion in the teaching of Loeb. Also, an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). In this case, a reciprocating engine or a turbine are equivalents for power conversion.

Claims 49: evaporation and return of solute to the pressure chamber – see evaporation pond 70 and the return line for concentrated brine. Also see figure 10 and column 13 lines 28-50.

Claims 47 and 48: see figure 10 wherein the solvent evaporated (in distillation plant 130) is also recycled through the solvent chamber of 124.

Claims 51 and 52 further recite the step of pressurizing the solvent chamber (claims 51 and 54) by a pump (claims 52 and 55), which Loeb'250 does not specifically teach. However, Loeb'250 teaches passing the lower osmotic pressure water (river water) in figure 6 or the condensed solvent in figure 10 and 11, which inherently require means for pumping or a pump. A prima facie case under 35 U.S.C. 102 /103 could be made if a process step is inherent: *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977) (Applicant claimed a process for preparing a hydrolytically-stable zeolitic aluminosilicate which included a step of "cooling the steam zeolite ... at a rate sufficiently rapid that the cooled zeolite exhibits a X-ray diffraction pattern ...." All the process limitations were expressly disclosed by a U.S. patent to Hansford except the cooling step. The court stated that any sample of Hansford's zeolite would necessarily be cooled to facilitate subsequent handling.

Regarding recycling solvent by evaporation using vacuum, see rejection over DE reference in paragraph 2 above.

Response to Arguments

Applicant's arguments filed 6/5/07 have been fully considered but they are not persuasive.

Dr. Wang's Declaration:

The Examiner acknowledges Dr. Wang's accomplishments. However, Dr. Wang's declaration fails to overcome the 35 USC 112, first paragraph, rejection of the claims because it is argumentative and presents no substantive evidence. *In re*

Chilowsky, 306 F.2d 908, 134 USPQ 515 (CCPA 1962) (expert opinion that an application meets the requirements of 35 U.S.C. 112 is not entitled to any weight; however, facts supporting a basis for deciding that the specification complies with 35 U.S.C. 112 are entitled to some weight)

Applicant's invention of a method of producing energy (or linear displacement as in claim 50), as understood by the Examiner, is summarized below:

1. An osmotic system having a solvent chamber and a pressure chamber separated by a semipermeable membrane; the pressure chamber having a solute solution, solvent chamber having a solvent, so that the osmotic pressure difference between the solvent chamber and the pressure chamber drives solvent from the solvent chamber to the pressure chamber, thereby increasing the pressure in the pressure chamber (and a vacuum in the solvent chamber). This increase in pressure is converted to linear motion and energy with a hydraulic piston.

2. The exhausting solute solution from the pressure chamber is recycled by separating the solute molecules from the solution by evaporation-condensation; the evaporation of the solvent being produced by applying the vacuum in the solvent chamber to the solute solution.

The first part of the invention, generating the pressure in the pressure chamber (and vacuum in the solvent chamber) is well known in the art. The osmotic pressure exerted by the solvent on the membrane due to the concentration difference between the solution and the solvent can be determined by the well-known Vant-Hoff equation.

The second part of the invention, that is, recycling the solute solution, is the part that requires energy to sustain, which is not adequately described in applicant's specification. The language of the claims recite that the energy for evaporation of the solvent from the solution is derived from the vacuum formed in the solvent chamber. Dr. Wang explains that the vacuum is a pleasant by-product, but should not be treated as the primary energy source, because the most power the vacuum can provide is derived from one bar pressure force, and that energy source of applicant's system is the ambient temperature.

There are several problems with this analysis. (a) The claim language of evaporating the solvent using vacuum generated by osmosis is unsustainable. The claim reads as if osmosis would provide pressure to the pressure chamber which can be converted to energy; osmosis also provides vacuum in the solvent chamber which can be used to make solvent out of the solution to sustain the process. Where is the energy coming from to sustain this process? (b) Argument that the energy is derived from the ambient is not commensurate in scope with the claims, because it is not there in the claims. (c) Applicant has not provided any disclosure for one of ordinary skill in the art to use the ambient temperature to supply energy to the system, without which, the system cannot be sustained. Simply stating that energy is derived from the ambient is not sufficient to enable the process.

The osmotic process produces energy by having the solvent migrate through the membrane to the pressure chamber, thereby consuming the solvent. To sustain the process, either there should be an infinite supply of solvent and solute (which is not

practical), or there must have a *means* to separate the solvent and the solute to recycle them. This *means* requires a primary energy source. The Examiner understands the applicant's and Dr. Wang's argument that this primary source is the ambient. However, that statement is not enough for patentability. There must be a tangible means or apparatus to convert energy from the ambient and supply to the process, which is lacking; and therefore, the process is not enabling.

With respect to Dr. Wang's comments regarding the rejection of the claims over Loeb, that the word "vacuum" and the concept of vacuum can be generated by osmosis process had not been mentioned in Loeb's patent, is not persuasive. Even if Loeb has not disclosed anything about this concept, it is not just a concept; it is a physical phenomenon that naturally occurs; it is inherent in the system. When a solution and a solvent are separated by a semipermeable membrane, the solvent will migrate from the solvent side to the solution side, increasing pressure at the solution side and decreasing pressure (or generating vacuum) at the solvent side. This principle is well represented in the figures 1-4 and 11 of Loeb.

Applicant's argument that Loeb simply fails to show a closed solvent chamber in which a vacuum develops is not persuasive. The systems shown at least in figures 10 and 11 are closed.

With respect to the use of vacuum in solvent recycle, as stated in the rejection, use of vacuum in solvent evaporation and condensing is well known in the art. Dr. Wang's expert opinion also testifies to this fact. Argument that use of vacuum in the

context of the present application is novel is not persuasive. The use of vacuum as claimed is an unsustainable process. Now, considering figures 9-11 of Loeb, the system described has a membrane in chamber 124, and the pressurized solution drives the energy converter turbine 126, and the spent solution is separated into solvent and concentrated solution in 130. The solvent is recycled back to the solvent side of chamber 124. Osmosis through the membrane produces a reduction in pressure (vacuum) on the solvent side in 124 (this is inherent in the system). It would be clear to one of ordinary skill in the art that the recycling solvent is drawn into chamber 124 by vacuum produced by osmosis at the membrane.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

6/12/07

Krishnan S Menon
Primary Examiner
Art Unit 1723